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# Relational climates moderate the effect of openness to experience on knowledge hiding: a two-country multi-level study

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## Abstract

**Purpose** – Understanding employee knowledge hiding behavior can serve organizations in better implementing knowledge management practices. The purpose of this study is to investigate how personality and work climate influence knowledge hiding, by examining the respective roles of openness to experience and relational (specifically, communal sharing and market pricing) climates.

**Design/methodology/approach** – Multilevel modeling was used with two distinct samples, one from Vietnam with 119 employees in 20 teams and one from The Netherlands with 136 employees in 32 teams.

**Findings** – In both samples, the hypothesized direct relationship between openness and knowledge hiding was not found. In the Vietnamese sample, only the moderating effect of market pricing climate was confirmed; in the Dutch sample, only the moderating effect of communal sharing climate was confirmed. The findings of the Vietnamese sample suggest that people with a high sense of openness to experience hide knowledge less under low market pricing climate. In the Dutch sample, people with high openness to experience hide knowledge less under high communal sharing climate. The authors conclude that, in comparison with personality, climate plays a stronger role in predicting knowledge hiding behavior.

**Research limitations/implications** – Small sample size and self-reported data might limit the generalizability of this study's results.

**Practical implications** – The paper highlights how organizational context (relational climate) needs to be taken into account in predicting how personality (openness to experience) affects knowledge hiding.

**Originality/value** – This paper contributes to a better understanding of the knowledge hiding construct by extending the set of known antecedents and exploring the organizational context in which such phenomena happen.

**Keywords** Personality, Multilevel modeling, Openness to experience, Knowledge hiding, Relational climate, Market pricing, Communal sharing

**Paper type** Research paper

## Introduction

Knowledge management is crucial to the success and survival of any organization as it provides competitive advantages (Chuang, 2004). First, knowledge management processes can help organizations efficiently acquire, store and use knowledge for work-related tasks (Ferraris *et al.*, 2017). Moreover, knowledge management uses existing knowledge as a resource and input in various other key organizational processes, such as the innovation process, which might result in competitive advantage.

However, a study among 700 US companies by Husted and Michailova (2002) reported that only small amounts of knowledge are shared while the majority is kept with employees, even when they leave the company. Building on this premise, Babcock (2004) concluded that Fortune 500 companies lose at least \$31.5bn a year by failing on knowledge sharing initiatives. An important question for management, human resources (HR) and researchers,

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therefore, remains how to use knowledge embedded in the organization by encouraging employees to share more knowledge. Nevertheless, the phenomenon of knowledge hiding – an intentional attempt to conceal or withhold knowledge that others have requested – may represent a threat to beneficial outcomes as well.

Researchers have argued and found that knowledge hiding is different from a mere lack of knowledge sharing, as it includes an *intentional* attempt to withhold knowledge from someone else (Connelly *et al.*, 2012). It is often compared to other negative behaviors, such as knowledge hoarding, counterproductive working behavior, aggression or even knowledge sabotage (Connelly *et al.*, 2012; Konstantinou and Fincham, 2011; Serenko, 2019). These findings suggest that knowledge hiding is a distinct and overlooked construct worth exploring, as it could negatively relate to individual, unit and/or organizational performance.

Surprisingly little research has been done so far to explore the antecedents and consequences of knowledge hiding (Connelly *et al.*, 2012; Peng, 2013; Wang *et al.*, 2019). A few studies did examine the correlates of knowledge hiding, including the distrust loop between knowledge hider and knowledge seeker (Connelly *et al.*, 2012), knowledge-based psychological ownership (Peng, 2013), Machiavellianism (Pan *et al.*, 2016), reduced creativity (Černe *et al.*, 2014) and increased voluntary turnover intentions (Serenko and Bontis, 2016). Studies conducted so far, however, have neglected two important aspects that could either hinder or enhance knowledge hiding in organizations, especially when interrelated – personality and context. In the present paper, therefore, two crucial antecedents of knowledge hiding will be central to the investigation. We argue that knowledge hiding is the result of an intricate combination of individual characteristics (openness to experience) and contextual factors (relational climate). We firmly believe that we need to deploy a person-by-situation approach to get the best possible picture of how knowledge hiding works. Now that the phenomenon of knowledge hiding as such has been established in literature, it is time to address the serious gaps that exist in our understanding of how personality and context interact to explain its occurrence.

First, then, the role of personality traits and their relationship with knowledge hiding remain underexplored in the literature (Connelly and Zweig, 2015; Malik *et al.*, 2019; Pan *et al.*, 2018). This is problematic as studies on personality traits have found that employees' dispositions predict job attitudes and behaviors throughout their careers (Staw *et al.*, 1986). It seems very likely that some personality traits can lead individuals to be more or less prone to hiding knowledge (Demirkasimoglu, 2016). For example, previous studies have found that personality traits, such as the Big Five, are closely related to behavioral intentions (Guadagno *et al.*, 2008) and motivation toward individual outcomes (Neuman *et al.*, 1999), such as knowledge sharing (Cabrera *et al.*, 2006) or job performance (Tett and Burnett, 2003). Among the Big Five traits, especially openness to experience has been under-researched compared to the other four characteristics (Klein and Lee, 2006; Penney *et al.*, 2011). This is surprising as openness highlights intellectual curiosity and can be linked to creativity, seeking out new independent ways of exploration and expression (Simha and Parboteeah, 2019) and knowledge sharing (Cabrera *et al.*, 2006). This suggests that the openness trait can be highly important for positive knowledge-related activities as indicated above; however, findings related to negative and deviant behaviors are rare and contradictory. For example, research has shown that in an educational context, there is a negative relationship between openness to experience and knowledge withholding intention (Wang *et al.*, 2014), yet openness might also be related to workplace delinquency (Murphy and Lee, 1994). We argue that further exploration of openness in relationship with knowledge hiding might provide new evidence of how personality, specifically openness to experience, relates to negative workplace behaviors such as knowledge hiding (Connelly and Zweig, 2015; Malik *et al.*, 2019; Simha and Parboteeah, 2019).

Second, although research suggests that knowledge hiding is situation specific and its motivation depends on the surroundings (Connelly *et al.*, 2012), very few studies in the knowledge hiding domain have taken into consideration the role of organizational context as yet (Connelly *et al.*, 2019). The context of a work situation (in the present study: relational climate) motivates individuals, provides cues as to how they should behave (Johns, 2018; Tett and Burnett, 2003) and boosts conformity and adherence to specific norms (Brock *et al.*, 2005). Investigating how organizational climate interacts with personality to activate individuals' traits and affect their behaviors could provide important insights into how knowledge hiding works. Specifically, we link the dyadic relational characteristic of knowledge hiding with an organizational climate that emphasizes relationships at work (Xiong *et al.*, 2019). A fundamental framework underlying human relational dynamics is relational model theory, first proposed by Fiske (1992). This theory stipulates that interactions between individuals follow certain patterns, grounded in practices, norms and formal rules (Batistič *et al.*, 2016); individuals might, therefore, act in a different way under different relational climates (Brock *et al.*, 2005). Thus, such climates might actively complement or inhibit individuals' openness to experience, hence affecting their motivation and behavior at work, which could result in different knowledge hiding outcomes.

Based on these considerations, our research question is as follows: To what extent do team-level relational climates moderate the relationship between individual-level openness to experience and knowledge hiding? The present inductive study will therefore contribute to knowledge management literature in two ways.

First, we aim to clarify how openness to experience relates to knowledge hiding. Addressing one of the most under-researched Big Five traits, we will investigate if individuals highly open to experience are less likely to hide knowledge (Simha and Parboteeah, 2019). This first aim answers to the call to explore how personality traits might relate to knowledge hiding (Connelly and Zweig, 2015; Pan *et al.*, 2018; Serenko and Bontis, 2016), as there might be important differences compared to previous studies focusing on knowledge sharing (Anand and Jain, 2014) or negative behaviors (such as knowledge withholding) in the educational sector (Wang *et al.*, 2014).

Second, our study aims to further expand the understanding of how contextual influences (specifically, relational climates) interact with personality characteristics (especially openness to experience) to affect knowledge hiding (Lewin, 1951; Pervin, 1989; Tett and Burnett, 2003; Xiong *et al.*, 2019). This second aim answers to the call for further multi-level approaches in studying knowledge hiding (Serenko and Bontis, 2016), where an interaction exists between personality and climate (Wang and Noe, 2010). It also elucidates how the context might change the way individuals hide knowledge (Connelly *et al.*, 2019). Moreover, it further enriches our understanding of what kind of context, namely, a relational based one, might hinder or enhance knowledge hiding in organizations (Connelly *et al.*, 2019; Connelly *et al.*, 2012).

In the sections below, we will develop and test a model of knowledge hiding that integrates contextual and personality characteristics, namely, relational climates and openness to experience. Then we will discuss the implications of our results for research on knowledge hiding, explain potential practical implications and elaborate on potential limitations and promising future research directions.

## Theoretical framework

### *Knowledge hiding*

Knowledge is a process, and knowledge management systems are aimed at the knowledge flow and the process of creating, sharing and distributing knowledge to allow the organization to gain or maintain competitive advantage (Alavi and Leidner, 2001). One of the key aims of knowledge management projects, according to Davenport and Prusak (1998), is

to develop a knowledge-intensive culture by encouraging positive behaviors such as knowledge sharing, as opposed to negative ones such as knowledge withholding or knowledge hiding.

Connelly *et al.* (2012) defined knowledge hiding as the intentional attempt to conceal or withhold knowledge requested by others. This definition emphasizes that when knowledge hiding occurs, it requires someone requesting specific knowledge or information and a knowledge holder intentionally not sharing it (Černe *et al.*, 2014; Connelly and Zweig, 2015; Connelly *et al.*, 2012). Knowledge hiding can have positive intentions or outcomes. It may be intended to protect the other party's feelings or interests, preserve confidentiality or even relate to higher sales performance (Connelly *et al.*, 2012; Wang *et al.*, 2019). As such it is not a uniformly negative behavior (Connelly *et al.*, 2012). However, in most work settings, it is considered a negative individual knowledge contribution (Babič *et al.*, 2019; Peng, 2013; Wang *et al.*, 2019).

Previous research has shown that knowledge sabotage, knowledge hoarding and knowledge sharing are constructs that are different from knowledge hiding (Serenko, 2019). Knowledge hoarding represents an act of accumulating knowledge that may or may not be shared later on (Evans *et al.*, 2015; Hislop, 2003). Both knowledge hiding and hoarding might be characterized by a repertoire of possible behaviors that can be linked to knowledge withholding; however, knowledge hiding represents the intentional concealment of knowledge requested by another individual (Connelly *et al.*, 2012), whereas knowledge hoarding captures the accumulation of knowledge that has not necessarily been requested by another individual (Webster *et al.*, 2008). Recently, scholars have also proposed knowledge sabotage as a negative behavior in organizations (Serenko, 2019). While with knowledge hiding, the asked party has the required knowledge, they do not know whether this knowledge is of critical importance and whether the requester will be able to effectively apply it to the work environment. With knowledge sabotage, however, employees intentionally give their colleagues wrong knowledge or hide critical knowledge despite being aware of the latter's need for this knowledge and their ability to apply it at work. This results in one of the most negatively impactful behaviors for an organization, even more so than knowledge hiding (Serenko, 2019).

Turning to a comparison of knowledge hiding and sharing, hiding is not the mere absence of sharing; hiding is rather the intentional attempt to withhold or conceal knowledge requested by another party. Authors highlight that the key difference might be in the motivation behind both behaviors (Connelly *et al.*, 2012). Knowledge hiding might be motivated by several different reasons, as mentioned above, whereas a lack of sharing is likely driven by an absence of knowledge itself (Connelly *et al.*, 2012).

### *Openness to experience as a predictor of knowledge hiding*

Despite these nomological differences, research on antecedents of knowledge hiding tackling the motivational aspect of this behavior remains scarce (Connelly *et al.*, 2019). One possible antecedent of such motivational and behavioral processes could be personality traits.

Personality is defined as the characteristic sets of behaviors, cognitions and emotional patterns that evolve from biological and environmental factors (Corr and Matthews, 2020). They are important in organizational contexts because they can predict an individual's actions (Staw *et al.*, 1986). Personality traits, and especially the Big Five, are among the most studied traits (John and Srivastava, 1999). Their success might be because of a replicable representation of the major dimensions: neuroticism (vs emotional stability), extraversion (vs introversion), openness to experience (vs cautiousness), conscientiousness (vs carelessness) and agreeableness (vs antagonism). Their five factor structure can be reliably generalized across different types of samples, raters and

methodological variations when comprehensive sets of variables are factored in [John and Srivastava \(1999\)](#). Our current focus on openness to experience as a predictor of knowledge hiding is based on its well-established links with positive behaviors, such as creativity ([Judge and Zapata, 2015](#)) and knowledge sharing ([Cabrera et al., 2006](#)).

The relationship of openness to experience with negative and deviant behavior, however, remains inconclusive at this time. For example, openness to experience is not considered part of a higher-order “moral personality” ([McFerran et al., 2010](#)) and some studies find only marginal correlations with unethical outcomes ([Simha and Parboteeah, 2019](#)). Several studies, on the other hand, suggest that low openness to experience results in right-wing authoritarianism, which tends to be associated with lower levels of moral reasoning ([McAdams, 2009](#)). Low openness to experience might also lead to deviant behavior in organizations ([Amiri et al., 2011](#)). We believe that this inconclusiveness warrants more research and argue that openness to experience might be related to less negative behaviors. We explain why this is the case below.

Individuals with high levels of openness are curious about both inner and outer worlds and they are willing to consider new ideas and unconventional values; they experience both positive and negative emotions more keenly, thus probably influencing wanted and unwanted behaviors such as knowledge hiding or sharing ([Anand and Jain, 2014](#); [Matzler et al., 2008](#)). More specifically, [Gupta \(2008\)](#) described people with high openness to experience as imaginative, creative, cultured, original, broad-minded, intelligent and artistically sensitive. Openness was also found to be positively related to self-perceptions of learning ability, motivation to learn and participation in development activities ([Major et al., 2006](#)). These findings relate to the notion that openness to experience is one of the key personality traits related to morality ([Simha and Parboteeah, 2019](#)) and dishonesty in general ([Nguyen and Biderman, 2013](#)). For example, [McAdams \(2009\)](#) argues that individuals high on openness to experience might have higher levels of moral reasoning, which suggests that they might be less prone to engage in negative behaviors (which knowledge hiding is often considered to be). Furthermore, [Simha and Parboteeah \(2019\)](#) did not find any relationship between openness to experience and willingness to justify ethically suspect behaviors, which shares some characteristics with knowledge hiding as well. They speculate that this might relate to individuals high on openness being more likely to be creative and seek out new independent ways of expression and exploration. Thus, it is quite likely that this part of their personality might prevail and buffer their unethical activity counterpart ([Baucus et al., 2008](#); [Simha and Parboteeah, 2019](#)). Therefore, open individuals might be more likely to share knowledge than hide it ([Cabrera et al., 2006](#); [Matzler and Mueller, 2011](#); [Matzler et al., 2008](#)). The core of openness, after all, is originality and curiosity, and open people tend to contribute knowledge and seek insights from others. Prior research by [Wasko and Faraj \(2000\)](#) illustrated that individuals are motivated to contribute knowledge to others when they perceive it as an “intellectual pursuit”; in other words, helping people solve problems is “challenging and fun.” This intrinsic motivation is best suited to those with high levels of openness to experience as they are usually keen to find new ways of overcoming problems and uncertain issues ([Srinivasan, 2009](#)).

Finally, it was found that openness to experience positively influenced perceived social identity, that is, reflecting how people perceive their fit within a certain social group ([Abrams and Hogg, 1988](#)), and in turn negatively affected knowledge withholding intentions ([Wang et al., 2014](#)). Hence, higher levels of openness to experience could lead to lower levels of knowledge hiding behavior. Therefore, we hypothesize:

*H1. Openness to experience is negatively related to knowledge hiding.*

### *Role of relational climate*

The organizational context consists of situational or environmental constraints and opportunities that can affect the occurrence and meaning of organizational behavior ([Johns, 2017](#)). Such an



idea is not new and has shown promising results in social psychology, where individuals exposed to a certain context (e.g. region) might display different personalities and, as a consequence, behave in different ways (Rentfrow, 2010). Thus, the understanding of several traditional variables, which are mostly explored at the individual level (e.g. personality and behaviors) can be considerably augmented by a contextual perspective (Johns, 2018). A higher-level organizational context can lead to the activation of certain constraints changing lower-level relationships, such as knowledge hiding behavior (Tett and Burnett, 2003).

We specifically focus our understanding of higher-level organizational context on the organizational climate (Tett and Burnett, 2003), which can thus serve as a higher-level moderator of the relationship between personality and individual behaviors (Johns, 2018; Tett and Burnett, 2003). More in detail we propose, similarly to Tett and Burnett (2003), that a context is relevant to a trait or behavior if it is thematically connected by the provision of cues/stimuli–response (or lack thereof), indicating a person's standing on the trait/behavior. For example, a situation that is characterized by heavy social exchange might be relevant for negative behaviors such as knowledge hiding, because conforming to such a context by exchanging knowledge (or not) might for various reasons relate to the essence of high or low knowledge hiding. Similar logic and framework have also been applied in studies exploring knowledge sharing (Liu and DeFrank, 2013), and for the above reasons, we believe it might work in the same way for knowledge hiding.

Knowledge hiding by definition is a dyadic and inherently relational exchange, and it has been demonstrated that employees consider situational and contextual signals when reacting to coworkers' requests for knowledge (Connelly *et al.*, 2012). Therefore, the higher-level context provided by a climate that highlights the relational and exchange nature of work relationships in an organization might be important. The relational model theory proposed by Fiske (1992) could provide such a climate and framework, as it explicitly argues that individuals are sociable – they generally organize their social lives in function of their relationships with other individuals. This theory proposes four elementary cognitive models in terms of which social relationships are represented, comprehended, evaluated and constructed (Haslam and Fiske, 1999). The relational model theory proposes that all individuals' interactions can be described in terms of just four “relational models” or elementary forms of individual interactions. As such, these four types of social interactions can form the context – relational climates – in which individuals build schemata to construct relationships (Johns, 2017; Tett and Burnett, 2003). Thus, relational climates can be defined as: “shared employee perceptions and appraisals of policies, practices and behaviors affecting interpersonal relationships in a given context” (Mossholder *et al.*, 2011, p. 36).

More in detail, there are thus four fundamental relation models to which people refer to generate social actions, understand and evaluate other's social behaviors as well as coordinate, plan, encode and remember social actions. They are communal sharing (*people interact with each other because they are in the same bounded group*), authority ranking (*people are ordered along a hierarchical social dimension*), equality matching (*people expect a balanced return and one-for-one correspondence*) and market pricing (*people rationally consider the cost–benefit analysis*). The relational climate model has been argued to affect an individual's attitudes and behaviors through shared norms and interactions among people (Batistič *et al.*, 2016). Previous research has indicated the effects of relational climate on individual characteristics, such as social cynicism (Tumasjan and Strobel, 2012) and proactivity (Batistič *et al.*, 2016). Overall, relational climate is relevant to understanding knowledge hiding as the latter focuses on dyadic relationships between individuals, which can be affected by the climate in place. While studying this effect has been advocated in the past, the role of climate remains underexplored in the knowledge hiding literature (Connelly *et al.*, 2019). Doing so will also allow us to explore how various relational climates can activate behavior in traits that might result in knowledge hiding (Xiong *et al.*, 2019).

In studying relational climates, we opted to focus on two extremes as such an approach leads to a clear recognition of central constructs, relationships and logics of the focal phenomenon (Eisenhardt and Graebner, 2007). This focus allows us to find patterns in the data more easily as well as provides more straightforward theoretical underpinnings and motivation (e.g. purely transactional relationships vs a Samaritan one) (Mills et al., 2010). A polar type approach has already been used previously, where communal sharing and market pricing climates were compared because they are opposed, and the striking differences could lead to better theoretical advancement (Batistič et al., 2016).

Thus in the next sections, based on the premise that a higher-level construct (relational climate) can activate individuals' behaviors (Johns, 2018; Tett and Burnett, 2003), we will explore how these two relational extremes – the communal sharing and market pricing climates – can affect the relationship between openness and knowledge hiding. Overall, people who are high in openness to experience will most likely adjust easily to changing and diversified work environments (LePine et al., 2000). Goldberg (1990) classified one's openness to experience as "intellect," therefore, people high in openness to experience are predicted to adjust their behaviors according to the relational climate. They are expected to act upon the returns of exchanged knowledge because of the nature of curiosity and the quest for new knowledge and experience.

### *Moderating effect of communal sharing climate on the relationship between openness to experience and knowledge hiding*

The communal sharing relationship is based on a conception of some bounded group of people as equivalent and undifferentiated (Fiske, 1992). Knowledge is viewed as a common good belonging to the whole group, thus members will share and exchange their knowledge for the group interest instead of personal interests (Faraj and Wasko, 2001). This relationship contains an almost pure type of altruism, as members in the communal sharing model regard other members like themselves and they voluntarily contribute their knowledge without receiving monetary rewards (Lee and Cole, 2003). The major elements in the communal sharing relation include altruism, community interest, helping others, group identification and collectivism (Haslam and Fiske, 1999); hence, a strong communal sharing climate would facilitate a decrease in knowledge hiding behavior.

This positive message of the climate will further activate behaviors in individuals with high openness. Potential negative behaviors spawning from openness to experience (e.g. low moral reasoning; McAdams, 2009), which could lead to knowledge hiding, will be substituted with positive behaviors in this climate (problems are an intellectual pursuit for highly open people, all are in the same boat here and "we need to help each other out"). This will lower potential knowledge hiding behaviors. In such a situation, knowledge is considered common property of the whole group (Fiske, 1992). Ultimately, we believe the communal sharing climate will ease the hesitation to share knowledge in this case and thus decrease the level of knowledge hiding.

A situation characterized by communal sharing and openness will result in a match between the characteristics of the context and personality, leading to a so-called fit situation (Cable and Edwards, 2004). Cable and Edwards (2004) argue that when the values of the person are congruent with the values of the climate, the person will experience cognitive assonance and positive job attitudes. In our case, this means that under a condition of high communal sharing, highly open individuals will be less prone to knowledge hiding.

- H2. Communal sharing climate moderates the negative relationship between openness to experience and knowledge hiding behavior, in such a way that this relationship is stronger (more negative) under higher levels of communal sharing climate.



### *Moderating effect of market pricing climate on the relationship between openness to experience and knowledge hiding*

The market pricing relationship is based on a model of proportionality in social relationships, in which all the relevant features and components under consideration are reduced into a single value that allows for the comparison of many qualitative and quantitative factors (Fiske, 1992). This is partly explained by psychological-need fulfillment studies, which indicate that a person cognitively compares the amount of reward they desire and the supplies provided by the organization (French *et al.*, 1982). Van Baalen *et al.* (2013) studied the principle behind knowledge sharing in a market pricing climate, where people could trade their knowledge for something they desire from the recipient or from the organization, and where cost-benefit ratios and rational calculation are applied. Many researchers found evidence supporting this relationship, such as Watson and Hewett (2006), who revealed the link between frequency of knowledge contribution and advancement within the organization, or Cabrera *et al.* (2006), who found a positive correspondence between extrinsic rewards and knowledge sharing; Wang and Noe (2010) even suggested that the effectiveness of extrinsic rewards in motivating knowledge sharing could be dependent on individual personality traits (including openness).

Overall, the negativity of the market pricing climate will result in competitiveness, which has been found to be positively related to knowledge hiding (Semerci, 2019). Individuals hide knowledge if they perceive no or lower benefits – either physical returns such as rewards, compensations and gifts, or non-physical returns such as similar knowledge or intellectual rewards (Boer *et al.*, 2011); hence, a strong market pricing climate would facilitate an increase in knowledge hiding behavior.

In terms of personality, we believe that the market pricing climate might activate more negative behaviors associated with the openness to experience trait. Thus, highly open individuals under such a climate would be motivated to show higher levels of dishonesty and deviance (Williams *et al.*, 2010). Under a market pricing climate, we believe that the context is going to offset the individual. In this climate, people cognitively compare the value of their resources with the amount they see as being received by the organization (French *et al.*, 1982). In our case, this means that under a condition of high market pricing, highly open individuals will be more prone to knowledge hiding.

- H3.* Market pricing climate moderates the negative relationship between openness to experience and knowledge hiding behavior, in such a way that this relationship is weaker (less negative) under higher levels of market pricing climate.

The conceptual model that results from our combined hypotheses is presented in Figure 1.

## **Method**

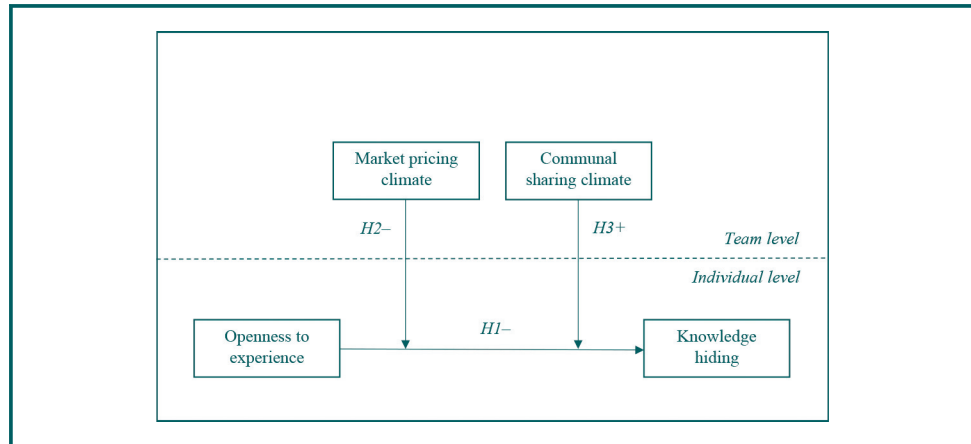
### *Sample and procedure*

The cross-sectional data of the present study were collected online using Qualtrics software in 2017 and comprised multiple work sectors from Vietnam and The Netherlands.

The empirical data of the Vietnamese sample were collected from 119 employees nested within 20 teams from 20 companies. The average number of participants per team was 5.95, ranging from 4 to 12. About 36% of the participants were male and their average age was 28.73 years (standard deviation [*SD*] = 4.35). The participants had been working at their current place of employment for an average of 3.31 years (*SD* = 2.65).

The empirical data of the Dutch sample were collected from 136 employees nested within 32 teams from 28 organizations. The average number of participants per team was 4.25, with a range from 2 to 9. Approximately 36% of the participants were male and their average age was 37.95 years (*SD* = 11.58). The participants had been working at their current place of employment for an average of 8.78 years (*SD* = 9.93). The sample in each

**Figure 1** Conceptual model and hypotheses



country could be seen as rather small for a multi-level analysis (Scherbaum and Ferreter, 2009); however, it may be deemed appropriate for exploratory studies (Wang *et al.*, 2015).

A comparative design was used to assess whether knowledge hiding scores differed between these two countries. To identify the differences between the key variables of the Vietnamese and Dutch sample, a one-way ANOVA was conducted. The results indicated that there were statistically significant differences between the two countries in the independent variable openness to experience and the focal (dependent) variable knowledge hiding. Specifically, the average score on knowledge hiding in the Vietnamese sample ( $M=2.64$ ,  $SD=1.25$ ) was significantly higher than that in the Dutch sample ( $M=1.54$ ,  $SD=0.77$ ),  $F(1, 253)=73.904$ ,  $p<0.001$ . In the same vein, the average score on openness to experience in the Vietnamese sample ( $M=5.10$ ,  $SD=0.92$ ) was significantly higher than that in the Dutch sample ( $M=4.78$ ,  $SD=0.91$ ),  $F(1, 253)=7.729$ ,  $p=0.006$ . The average scores on communal sharing climate in the Vietnamese sample ( $M=4.95$ ,  $SD=0.84$ ) were not significantly different from those in the Dutch sample ( $M=5.15$ ,  $SD=0.87$ ),  $F(1, 253)=3.543$ ,  $p=0.061$ . Likewise, the average scores on market pricing climate in the Vietnamese sample ( $M=3.99$ ,  $SD=0.96$ ) were not significantly different from those in the Dutch sample ( $M=3.79$ ,  $SD=0.80$ ),  $F(1, 253)=3.115$ ,  $p=0.079$ . Therefore, all hypotheses were examined separately for the Vietnamese and Dutch samples.

To acquire these samples, companies from the personal networks of the research group members were approached to participate in the study. Usually through the HR department, several teams per company were then approached and selected on their willingness to participate. Although at first glance, this might seem problematic for generalizability, such sampling techniques are adequate when the aim of the analysis is theory building (Vandenbosch *et al.*, 2006), which is how we see our study. Teams were seen as having at least three members and a single supervisor to allow for a multilevel structure to be analyzed (Hox, 2010); therefore, departments with several supervisors could have several teams in the study. Through the data collection procedure (using Qualtrics software), joint team members could be identified as such.

The scales for both samples were translated from English to the official language of each country and then back to English, following a translation-back-translation procedure (Brislin, 1986). Organizations had to meet a specific requirement to be included in both samples: they had to have at least 50 employees per company to ensure an established organizational climate. We did not limit the sample to specific industries; however, most of the sample in both countries (70% in Vietnam and 63% in The Netherlands) comes from

knowledge-intensive industries where knowledge exchange is at the core of business, such as banking, insurance, audit, data solutions, universities, consultancy and smart industries.

## Measures

*Knowledge hiding* was self-reported and assessed with a 12-item scale developed by Connelly *et al.* (2012) (Vietnam,  $\alpha = 0.92$ ; The Netherlands,  $\alpha = 0.87$ ; see Appendix). This scale has been widely used by recent research on knowledge hiding, such as Černe *et al.* (2014), Demirkasimoglu (2015) and Pan *et al.* (2016). The items asked participants to think about a recent situation when a specific colleague had requested knowledge from them and they rejected to provide the answers, followed by “In this case, I [...]” Consistent with the original scale (Connelly *et al.*, 2012) and literature on deviant behaviors (Krosgaard *et al.*, 2002), the introduction question was based on the critical incident technique, in which participants were asked to answer questions about a recent incident at work. Sample items are “Agreed to help him/her but never really intended to” or “Pretended that I did not know the information” with a rating scale from 1 = “not at all” to 7 = “to a very great extent.”

*Openness to experience* was selected from the Big Five personality model. There are several self-reported constructs to measure the Big Five. In the present study, the respondent’s personality structure was assessed using 15 items from the Big Five Inventory Version (BFI-S) by Gerlitz and Schupp (2005), Lang *et al.* (2011) and John and Srivastava (1999). The BFI-S is a relevant and short instrument designed to measure the Big Five personality factors in large surveys. Langford (2003) suggested that this scale is an optimal balance between economy and validity. In addition, the 15-item scale was found to be robust in different assessment methods such as computer-assisted, paper and pencil, telephone and self-administration versions, across five-year longitudinal research and across young, middle and old adulthood (Lang *et al.*, 2011).

For openness to experience, three items were included in the questionnaire (Vietnam,  $\alpha = 0.70$ ; The Netherlands,  $\alpha = 0.46$ ). To be noted here is that this scale was not developed specifically to maximize internal consistency (Cronbach’s alpha), as with only three items, this cannot be effectively achieved (Gosling *et al.*, 2003). For example, Lang *et al.* (2011) reported reliability of 0.63, whereas Gosling *et al.* (2003) reported 0.45. Rather, the scale emphasizes the content validity, by means of lower inter-item correlations than typically more homogenous scales. Short personality scales are more reliable in the long run, as the reliability of a short scale after the test–retest is considered to be acceptable in most cases (Gosling *et al.*, 2003; Lang *et al.*, 2011). The short scale was chosen because data had to be collected as part of a larger research project. Respondents had to indicate to what extent the personality statement best described and applied to them, ranging from 1 = “strongly disagree” to 7 = “strongly agree.”

*Communal sharing and market pricing* relational climates were measured using eight-item scales by Haslam and Fiske (1999), with the respondent’s other team members as referent other. Sample items for communal sharing climate include “You share many important responsibilities jointly, without assigning them to either of you alone” or “You make decisions together by consensus” (Vietnam,  $\alpha = 0.81$ ; The Netherlands,  $\alpha = 0.79$ ). Sample items for market pricing climate include “What you get from your coworkers is directly proportional to how much you give them” or “With this person, you make decisions according to the ratio of the benefits you get and the costs to you” (Vietnam,  $\alpha = 0.83$ ; The Netherlands,  $\alpha = 0.68$ ). The participants were asked to rate the relationship with their co-workers from 1 = “very untrue of this relationship” to 7 = “very true of this relationship.”

As the perceived climate reflects employees’ shared perceptions (Batistič *et al.*, 2016), communal sharing and market pricing climates were captured at team level by aggregating the scores of all individual employees in each team. The intraclass correlations (ICCs) and

the multi-item within-group agreement [ $r_{wg(j)}$ ] were calculated to validate the aforementioned aggregations.

For the Vietnamese sample,  $r_{wg(8)}$  of communal sharing climate ranged from 0.72 to 0.93 (a slightly skewed shape) with a mean of 0.83; ICC1 was 0.20 and ICC2 was 0.60 ( $F=2.48$ ,  $p=0.002$ ). For market pricing climate, the range of  $r_{wg(8)}$  fluctuated between 0.68 and 0.92 (also a slightly skewed shape) and the mean was 0.80, with ICC1 at 0.20 and ICC2 at 0.60 ( $F=2.51$ ,  $p=0.002$ ).

For the Dutch sample,  $r_{wg(8)}$  of communal sharing climate ranged from 0.69 to 0.94 (a slightly skewed shape) and the mean was 0.83; ICC1 was 0.30 and ICC2 was 0.64 ( $F=2.79$ ,  $p<0.001$ ). For market pricing climate, the range of  $r_{wg(8)}$  was 0.67–0.95 (also a slightly skewed shape) and the mean was 0.80, with ICC1 at 0.19 and ICC2 at 0.51 ( $F=2.02$ ,  $p=0.004$ ).

According to [James et al. \(1984\)](#), the range of ICC1 is generally between 0 and 0.50, with a median of 0.12. The values obtained in the present study are above this median and indicate significant between-group variances in relational climate. Nevertheless, there are no definite guidelines for determining acceptable values. Although no critical cutoff exists for  $r_{wg(j)}$  estimates, the traditional heuristic cutoff suggested for aggregation is 0.70 ([James et al., 1984](#); [Lance et al., 2006](#)). To address our research question and ground our efforts to aggregate measures regarding the relational climate in a team as perceived by employees, we decided to create aggregate measures of the communal sharing and the market pricing climates. Perceived team climates represent employees' shared perceptions and, as a result, an aggregated measure for climate may be the most appropriate way to examine its relationship with knowledge hiding ([Connelly et al., 2012](#)).

*Control variables.* Besides personality, other individual factors such as age, gender and working tenure can also influence employees' knowledge behavior ([Wang and Noe, 2010](#)). Hence, it was essential to control for these factors to further explore their impact on our key variables. Age, gender and working tenure were included in the questionnaires and self-reported by the participants. Age and working tenure (general work experience) were coded as ratio variables and measured in years. Gender was coded as a nominal variable in which male was coded as 1 and female was coded as 2.

## Analysis and results

### Common method bias

Instead of using Harman's single-factor test, we used a technique of controlling for the effect of an unmeasured latent methods factor in both samples to detect the potential problem of common method bias ([Podsakoff et al., 2003](#)). Using this method allows us to check if the variance of the responses to a specific measure is partitioned into three components: trait, method and random error. However, this method cannot tackle the identification of the specific cause of method variance. Despite this, [Podsakoff et al. \(2003\)](#) suggest using this approach if the foci phenomena are measured in different contexts, like in our research.

The items were loaded on their theoretical constructs as well as on a latent common method variance factor and the significance of the structural parameters was examined both with and without the latent common methods variance factor in the model. The two models of both samples were not significantly different, as the largest difference of the standardized regression weights between the models was 0.086 for the Vietnamese sample and 0.019 for the Dutch sample. Therefore, common method bias was not a pervasive problem in the present study.

### Descriptive statistics, validity, reliability and model specification

The descriptive statistics for all variables of both samples are presented in [Table 1](#). Model fit with the data for both the Vietnamese and Dutch sample was evaluated by confirmatory

**Table 1** Means, SDs and correlations

Variables	Mean	SD	1	2	3	4	5	6	7
<i>Level 1 (Individual level)</i>									
Openness to experience	5.10/4.78	0.92/0.91	(0.70/0.46)	−0.10	0.09	0.14	−0.06	0.13	−0.06
Knowledge hiding	2.64/1.54	1.25/0.77	−0.02	(0.92/0.87)	−0.11	0.12	−0.15	−0.22*	−0.02
Communal sharing climate	4.95/5.15	0.84/0.87	0.10	−0.04	(0.81/0.79)	0.16	0.11	−0.13	−0.04
Market pricing climate	3.99/3.79	0.96/0.80	0.01	0.20*	0.30**	(0.83/0.68)	−0.03	−0.06	0.01
Gender			−0.15	−0.06	−0.05	0.04		−0.20	−0.08
Age	28.73/37.95	4.35/11.58	0.32**	0.09	0.15	0.09	−0.13		0.70**
Working tenure	3.31/8.78	2.65/9.93	0.23*	0.13	0.24**	0.18*	−0.14	0.58**	
<i>Level 2 (Team level)</i>									
Communal sharing climate	4.95/5.15	0.48/0.59	(0.81/0.79)	0.10					
Market pricing climate	3.99/3.79	0.55/0.49	0.61**	(0.83/0.68)					

**Notes:** Correlations for the Vietnamese and Dutch samples are in the lower and upper triangles, respectively. Means and SDs for the Vietnamese and Dutch samples are reported on the left- and right-hand sides of the slashes, respectively. \*\*Correlation is significant at the 0.01 level (two-tailed). \*Correlation is significant at the 0.05 level (two-tailed). Coefficient alphas are on the diagonal in parentheses. On the left- and right-hand sides of the slashes are the coefficient alphas of the Vietnamese and Dutch sample, respectively. Gender: male coded as 1 and female coded as 2. Relational climates at level 1 represent employee perceptions, whereas at level 2 they represent aggregated scores at the team level

factor analysis using AMOS 24 software. For the Vietnamese sample, the expected four-factor solution (openness to experience, knowledge hiding, communal sharing and market pricing) fit reasonably with the data ( $\chi^2$  [397] = 567.499, comparative fit index [CFI] = 0.90, Tucker–Lewis index [TLI] = 0.882, root mean square error of approximation [RMSEA] = 0.060). The factor loadings ranged from 0.362 to 0.662 for the communal sharing climate items, from 0.458 to 0.721 for the market pricing climate items, from 0.427 to 0.886 for the knowledge-hiding items and from 0.482 to 1.085 for the openness to experience items. For the Dutch sample, the expected four-factor solution (openness to experience, knowledge hiding, communal sharing and market pricing) fit moderately with the data ( $\chi^2$  [384] = 550.731, CFI = 0.891, TLI = 0.868, RMSEA = 0.057). The factor loadings ranged from 0.260 to 0.817 for the communal sharing climate items, from 0.099 to 0.682 for the market pricing climate items, from 0.435 to 0.854 for the knowledge-hiding items and from 0.207 to 1.182 for the openness to experience items. Although some factor loadings were rather low, no item was deleted to sustain the integrity of the scales.

We also checked for discriminant validity and multicollinearity. All variance inflation factors (VIFs) were below 10 (Hair *et al.*, 2010), ranging from 1.01 to 1.15 for the Vietnamese sample and from 1.02 to 1.04 for the Dutch sample. Discriminant validity was checked by looking at the square root of the average variance extracted (AVE) and compared to its correlations with other factors. Results for both countries were acceptable (the square root of AVE was always greater than inter-construct correlations), although AVE for market pricing and communal sharing was below the suggested threshold of 0.5 in Vietnam (0.40 and 0.41, respectively) and quite problematic in The Netherlands (0.34 for the market pricing and 0.32 for communal sharing). This is on the low side and some authors suggest low factor loadings should be deleted to increase AVE (Hair *et al.*, 2010); however, for the same reasons as described above – retaining the scale integrity – and as VIF did not flag any problems and the composite reliability for all climates was always above 0.6 (Fornell and Larcker, 1981), we decided to continue with the analyses.

### Multilevel analysis results

When data are collected from multiple individuals in a team, the individual data are considered nested within that team, therefore our data consists of two levels – individuals and teams (as one comprehensive score for all individuals in the team). As relational climates were aggregated at the team level, using multilevel analysis is warranted as such a

method allows us to split residual components and variance between levels (individual and team), as both can influence the focal outcomes (Hox, 2010). We used multilevel analyses as traditional regression techniques treat the unit of analysis as independent observations, failing to recognize the nested structure (having multiple individuals nested with a team; because individuals in the team are not independent of each other), thus leading to underestimation of standard errors and an overstatement of statistical significance. This is especially true for higher-level constructs, such as contextual ones (Klein and Kozlowski, 2000). A similar approach to ours has been used already in various knowledge hiding studies, which are based on nested data (Babič *et al.*, 2019; Černe *et al.*, 2017; Huo *et al.*, 2016). Thus, we see our approach as correct and superior to classical regression approaches.

Multilevel analysis was conducted using HLM software, version 7.03, with restricted maximum likelihood estimation for both samples. The Vietnamese data set had two hierarchical levels: 119 employees as level 1 and 20 teams as level 2. The Dutch data set had two hierarchical levels: 136 employees as level 1 and 32 teams as level 2. Following the steps in hierarchical linear modeling (or random coefficient modeling), four models were tested:

1. The intercept model to test the existence of a multilevel structure.
2. The level-1 model to test the relationship between openness to experience and knowledge hiding – *H1*.
3. The cross-level model to test the relationships of communal sharing climate and market pricing climate with knowledge hiding, holding all other variables constant.
4. The interaction model to test the moderation of communal sharing climate as well as market pricing climate and openness to experience toward knowledge hiding – *H2* and *H3*.

For hypotheses testing, Table 2 represents the results (per sample) of all four multilevel models in predicting knowledge hiding. Pseudo  $R^2$  by Snijders and Bosker (2012) and deviance are also reported at the end of Table 2.

*Vietnamese sample.* First, knowledge hiding was added as the outcome variable (Model 1) and it was tested if there was any difference at the group level, to confirm the necessity of multilevel modeling. The chi-square test was statistically significant ( $\chi^2 = 33.38$ ,  $p < 0.05$ ), indicating that there was variance in knowledge hiding by the higher-level grouping. Therefore, multilevel modeling was needed.

Second, we inserted openness to experience as a level-1 predictor variable to knowledge hiding, along with gender, age and working tenure as control variables (Model 2). *H1* proposed that openness to experience had a negative effect on knowledge hiding. However, based on the results, this relationship was not statistically significant ( $\gamma = -0.07$ ,  $SE = 0.16$ ,  $p = 0.65$ ). *H1* was therefore not supported by the Vietnamese sample.

Third, the communal sharing and market pricing climates were added to test the cross-level effects of level 2 toward the outcome variable (Model 3). The coefficients of the communal sharing and market pricing climates were both significant ( $\gamma = -0.60$ ,  $SE = 0.24$ ,  $p = 0.023$ ;  $\gamma = 0.60$ ,  $SE = 0.27$ ,  $p = 0.041$ , respectively). Communal sharing climate related negatively to knowledge hiding, whereas market pricing climate related positively to knowledge hiding.

Fourth, in Model (4), a random intercepts and slopes model was used to test the interactions of openness to experience and both the communal sharing and market pricing climates toward knowledge hiding. *H2* stated that there is a negative relationship between openness to experience toward knowledge hiding and a communal sharing climate would strengthen this relationship. As presented in Table 2, the interaction term between openness to experience and communal sharing climate was marginally significant ( $\gamma = -0.66$ ,  $SE = 0.35$ ,



**Table 2** Multilevel analysis results for knowledge hiding as dependent variable

	Vietnamese sample				Dutch sample			
	Model (1)	Model (2)	Model (3)	Model (4)	Model (1)	Model (2)	Model (3)	Model (4)
<i>Level 1</i>								
Intercepts	2.64 (0.14)**	2.64 (0.14)**	0.30(1.06)	2.63 (0.13)**	1.56 (0.08)**	1.56 (0.08)**	1.56 (0.08)**	1.56 (0.07)**
Gender		−0.20 (0.19)	−0.20 (0.20)	−0.25 (0.20)		−0.19 (0.22)	−0.19 (0.22)	−0.24 (0.17)
Age		−0.02 (0.03)	−0.02 (0.03)	−0.01 (0.03)		−0.02 (0.01)*	−0.02 (0.01)*	−0.02 (0.01)*
Tenure		0.05 (0.04)	0.05 (0.04)	0.04 (0.04)		0.01 (0.02)	0.01 (0.02)	0.01 (0.1)
Openness to experience		−0.07 (0.16)	−0.07 (0.16)	−0.14 (0.12)		−0.07 (0.09)	−0.07 (0.09)	−0.09 (0.08)
<i>Level 2</i>								
Communal sharing			−0.60 (0.24)*	−0.60 (0.24)*			−0.04 (0.10)	−0.04 (0.10)
Market pricing			0.60 (0.27)*	0.60 (0.27)*			0.24(13)	0.25 (0.13)
<i>Interaction effects</i>								
Openness to experience × Communal sharing				−0.66 (0.35)				−0.23 (0.12)*
Openness to experience × Market pricing				0.69 (0.19)**				0.04 (0.12)
Pseudo $R^2$		−0.017	0.001	0.026		0.016	0.021	0.036
Deviance	389.90	400.23	397.56	393.13	311.44	324.55	326.11	325.83
<i>N</i> (Level 1)	119	119	119	119	136	136	136	136
<i>N</i> (Level 2)	20	20	20	20	32	32	32	32

**Notes:** The results are the estimates of the fixed effects with robust standard errors. Vietnamese results are reported on the left-hand side, whereas Dutch results are reported on the right-hand side of the table. \* $p$ -value < 0.05; \*\* $p$ -value < 0.01

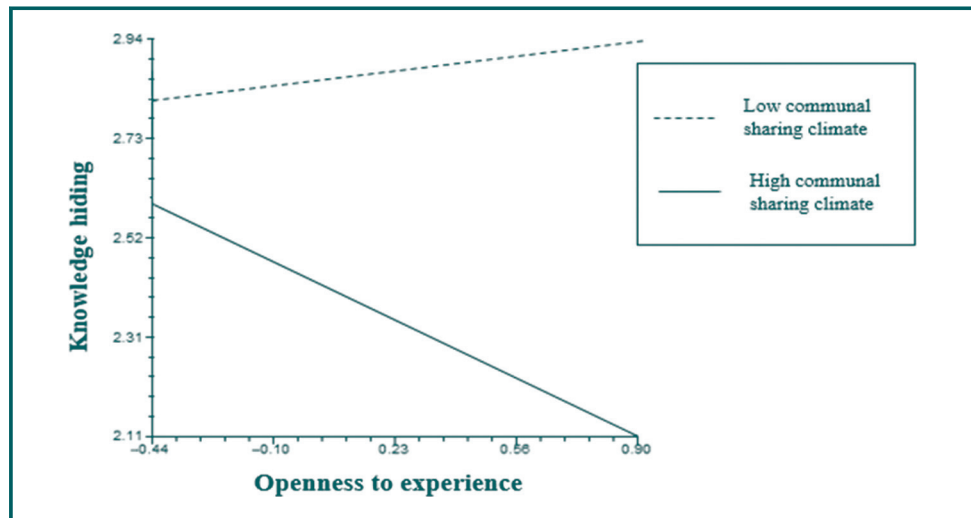
$p=0.064$ ). Given the marginally significant result, simple-slopes tests were conducted with the online tool developed by Preacher *et al.* (2006). The lower and upper values were set at 1 SD above and below the mean. For communal sharing, the simple slope was not significant at either the lower or higher bound, [ $w(1) = -3.11$ ,  $SE = 1.62$ ,  $t = -1.92$ ,  $p = 0.058$  and  $w(2) = -3.74$ ,  $SE = 1.96$ ,  $t = 1.91$ ,  $p = 0.059$ , respectively] [1]. Figure 2 (from HLM) displays the model.  $H2$  was therefore not supported.

Regarding market pricing climate,  $H3$  argued that people will hide more knowledge under higher levels of market pricing climate and higher levels of openness to experience. Results showed that the interaction term between openness to experience and market pricing climate was positive, and the effect was statistically significant ( $\gamma = 0.69$ ,  $SE = 0.19$ ,  $p < 0.001$ ). Simple-slopes tests were conducted using the same procedure as explained above. Simple-slopes test showed significant results at both the lower and upper bounds [ $w(1) = 2.24$ ,  $SE = 0.62$ ,  $t = 3.60$ ,  $p = 0.0005$  and  $w(2) = 2.99$ ,  $SE = 0.83$ ,  $t = 3.61$ ,  $p = 0.0005$ , respectively] [2]. Figure 3 displays this result and, hence,  $H3$  was supported for the Vietnamese sample.

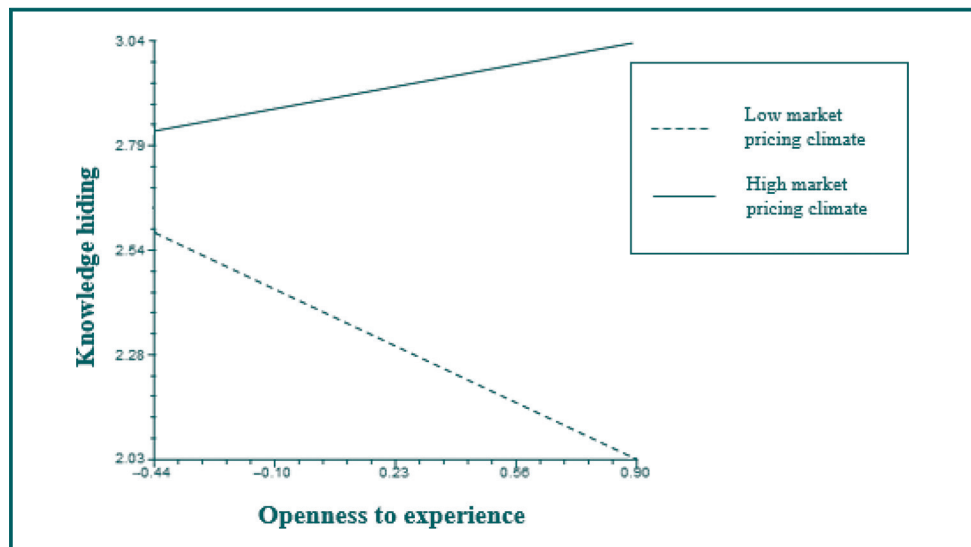
*Dutch sample.* The exact same procedure as in the Vietnamese sample was used for the Dutch sample, so as to keep the results comparable. First, knowledge hiding was added as the dependent variable (Model 1). The chi-square test was statistically significant ( $\chi^2 = 47.75$ ,  $p < 0.05$ ). The necessity of multilevel modeling was confirmed by this, as there was variance in knowledge hiding by the higher-level grouping.

Then, openness to experience was added as a level-1 predictor variable of knowledge hiding, along with the control variables (Model 2). The results did not support the assertion that openness to experience had a negative effect on knowledge hiding ( $\gamma = -0.07$ ,  $SE = 0.09$ ,  $p = 0.45$ ).  $H1$  was therefore not supported.

**Figure 2** Cross-level interaction between openness to experience and communal sharing climate toward knowledge hiding in Vietnam



**Figure 3** Cross-level interaction between openness to experience and market pricing climate toward knowledge hiding in Vietnam



To examine the cross-level main effects of relational climate, both communal sharing and market pricing climates were added in the model (Model 3). The coefficients of both the communal sharing and market pricing climates were not significant ( $\gamma = -0.04$ ,  $SE = 0.10$ ,  $p = 0.68$  and  $\gamma = 0.24$ ,  $SE = 0.12$ ,  $p = 0.056$ , respectively).

Next, we tested the interaction effects of openness to experience and both relational climates on knowledge hiding (Model 4).  $H2$  stated that there is a negative relationship between openness to experience and knowledge hiding, with communal sharing climate strengthening this relationship. As shown in Table 2, the interaction term between openness to experience and communal sharing climate was negative and significant ( $\gamma = -0.24$ ,

$SE=0.12$ ,  $p=0.044$ ). Simple-slopes tests, following the same procedure as in the Vietnamese sample, revealed significant results at both the lower and upper bounds [ $w(1) = -1.15$ ,  $SE=0.52$ ,  $t=2.21$ ,  $p=0.029$  and  $w(2) = -1.43$ ,  $SE=0.66$ ,  $t=2.94$ ,  $p=0.032$ , respectively] [3]. Figure 4 displays the model.  $H2$  was therefore supported for the Dutch sample.

$H3$  stated that people would hide more knowledge under higher levels of market pricing climate and higher levels of openness to experience. Results showed that the interaction term between openness to experience and market pricing climate was not statistically significant ( $\gamma = 0.04$ ,  $SE=0.12$ ,  $p=0.751$ ). Therefore,  $H3$  was not supported by the Dutch sample. Table 3 contains an overview for all hypotheses of whether they were supported or rejected in both samples.

### Additional analyses

We decided to check how our analysis would turn out if both samples (Vietnamese and Dutch) were merged into one large sample with the country being used as a control

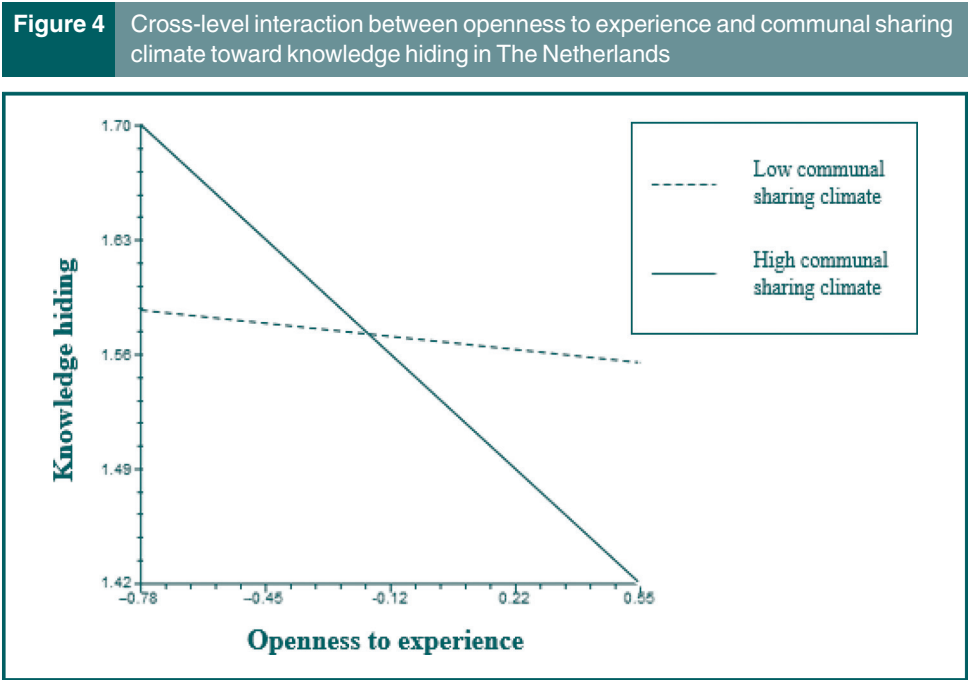


Table 3 Overview of hypotheses and whether they were supported or rejected in both samples		
Hypothesis	Vietnamese sample	Dutch sample
H1: Openness to experience is negatively related to knowledge hiding	Rejected	Rejected
H2: Communal sharing climate moderates the negative relationship between openness to experience and knowledge hiding behavior, in such a way that this relationship is stronger (more negative) under higher levels of communal sharing climate	Rejected	Supported
H3: Market pricing climate moderates the negative relationship between openness to experience and knowledge hiding behavior, in such a way that this relationship is weaker (less negative) under higher levels of market pricing climate	Supported	Rejected

variable. Following the same procedure as before, knowledge hiding was added as the dependent variable. The chi-square test was statistically significant ( $\chi^2 = 156.24$ ,  $p < 0.01$ ) and thus, the necessity of multilevel modeling was confirmed.

Openness to experience was added as a level-1 predictor variable of knowledge hiding, along with the control variables. The results did not support the hypothesis that openness to experience had a negative effect on knowledge hiding ( $\gamma = -0.07$ ,  $SE = 0.09$ ,  $p = 0.46$ ). *H1* was therefore not supported.

Both communal sharing and market pricing climates were then added to the model. The coefficient of communal sharing climate toward knowledge hiding was not *significant* ( $\gamma = -0.17$ ,  $SE = 0.11$ ,  $p = 0.13$ ), whereas the coefficient of market pricing climate was significant ( $\gamma = 0.33$ ,  $SE = 0.14$ ,  $p = 0.02$ ). The interaction effects of openness to experience and both relational climates were regressed on knowledge hiding. *H2* stated that there would be a negative relationship between openness to experience and knowledge hiding, with communal sharing climate strengthening this relationship. The interaction term between openness to experience and communal sharing climate was negative and significant ( $\gamma = -0.28$ ,  $SE = 0.14$ ,  $p = 0.04$ ). Simple-slopes tests, following the same procedure as before, revealed significant results at both the lower and upper bounds [ $w(1) = -1.23$ ,  $SE = 0.49$ ,  $t = -2.52$ ,  $p = 0.013$  and  $w(2) = -1.76$ ,  $SE = 0.71$ ,  $t = -2.49$ ,  $p = 0.014$ , respectively] [4]. *H2* was therefore supported.

*H3* stated that people would hide knowledge more under higher levels of market pricing climate and higher levels of openness to experience. Results showed that the interaction term between openness to experience and market pricing climate was positive and statistically significant ( $\gamma = 0.32$ ,  $SE = 0.13$ ,  $p = 0.012$ ). Simple-slopes tests showed significant results at both the lower and upper bound [ $w(1) = 1.17$ ,  $SE = 0.51$ ,  $t = 2.29$ ,  $p = 0.023$  and  $w(2) = 1.77$ ,  $SE = 0.74$ ,  $t = 2.38$ ,  $p = 0.019$ , respectively] [5]. Thus, *H3* was supported.

## Discussion

Building on personality traits theories (Pervin, 2003), contextual theory (Johns, 2006) and relational model theory (Fiske, 1992), the present study investigated antecedents of knowledge hiding by examining the role of openness to experience as well as the interaction between openness and context, namely, communal sharing and market pricing relational climates. Our research question was: To what extent do these two team-level relational climates moderate the relationship between individual-level openness to experience and knowledge hiding? Multilevel modeling was applied using two distinct samples (from Vietnam and The Netherlands). In both samples, the personal characteristic of openness to experience did not significantly predict knowledge hiding. A non-hypothesized but significant negative cross-level relationship between communal sharing and knowledge hiding, and a positive cross-level relationship between market pricing climate and knowledge hiding were found in the Vietnamese sample. These results were not replicated in the Dutch sample.

Regarding the moderating effects of both climates, the Vietnamese and Dutch samples yielded different results. In the Vietnamese sample, no moderation was found between communal sharing climate and openness to experience toward knowledge hiding. Market pricing climate, however, acted as moderator. Specifically, at higher levels of openness to experience and higher levels of market pricing climate, people were found to hide knowledge significantly more. In contrast, in the Dutch sample, we found evidence supporting a moderating effect on the relationship between openness to experience and knowledge hiding, for communal sharing climate but not for market pricing climate. Particularly, at higher levels of communal sharing climate and lower levels of openness to experience, people were found to hide knowledge more.

## Theoretical contributions

Strategies and tools to make full use of knowledge among employees are crucial to any organization's knowledge management process and systems to gain and retain competitive advantage (Ferraris *et al.*, 2017). Among these, minimizing knowledge hiding is considered one of the main challenges (Connelly *et al.*, 2012). Our findings contribute to the knowledge and general management literatures dealing with this phenomenon in two ways.

In terms of our first aim, this study provides a better understanding of the personality characteristic openness to experience specifically as it relates to knowledge hiding (Pan *et al.*, 2018). Even though highly open people have been described as individualistic (McCrae and Sutin, 2009), interrupting the harmonious relationship in the workgroup (Lun and Bond, 2006) and negatively correlating to how well team members get along with each other (Stewart *et al.*, 2005), empirical and theoretical findings in an educational context have shown that openness to experience is negatively related to knowledge withholding intentions through social identity (Wang *et al.*, 2014). Our results supported this direct relationship neither in Vietnam nor in The Netherlands. Even if these findings were not conclusive, it may be the case that knowledge hiding is indeed a situational characteristic, as theorized by Connelly *et al.* (2012), and as such needs an activator, which can be found in an organizational context such as a climate (Tett and Burnett, 2003). This speculation is partially supported by our finding that climates can indeed interact with openness to experience to affect knowledge hiding behavior. Moreover, the characteristics of openness to experience (e.g. highly tolerant, accepting of different opinions; Wang *et al.*, 2014) may be reflected in more creative individuals who seek out new independent ways of exploration and expression (Judge and Zapata, 2015). This independent creativity in turn may be rather different from more negative behaviors such as knowledge hiding (Simha and Parboteeah, 2019), thus in a way mitigating or preventing unethical behavior.

In terms of our second aim, the theoretical contribution of the current study lies in the moderating roles of the communal sharing and market pricing climates in interaction with openness to experience toward knowledge hiding. As knowledge hiding is a situational behavior (Černe *et al.*, 2014; Connelly *et al.*, 2012), it might be the case that the behavior will be shown only under a certain trait supported by the right or appropriate context (Connelly *et al.*, 2019; Johns, 2006; Serenko and Bontis, 2016). Such a combination can also be reflected in a situation of fit vs non-fit between context and individual (Cable and Edwards, 2004), which carries important theoretical implications with it for the knowledge hiding phenomenon. To tackle this issue, we used a multi-level framework, where climate was treated as a bottom-up emerging phenomenon (Batistič *et al.*, 2016). Overall, our results support the notion that the interaction between individual and context is important in predicting knowledge hiding; however, it also emphasizes that the story behind the results might be more complicated than proposed in the first place. The market pricing climate had a significant impact on the relationship between openness to experience and knowledge hiding only in the Vietnamese sample. Individuals were found to hide more knowledge under high openness to experience and market pricing climate. On the contrary, the communal sharing climate had a significant moderating role only in the Dutch sample, where more knowledge hiding was found under low openness to experience and high communal sharing climate. These divergent results might result from different characteristics of each country's national culture (Brock *et al.*, 2005), a possibility that we will elaborate upon below.

Brock *et al.* (2005) argue that there might be a spillover of national culture, norms and beliefs to a more localized organization culture. Some authors go even further, arguing that national culture can actually constrain the organizational culture by providing accepted rules of how one should behave, and argue that the national culture can explain as much as 43% of organizational culture (Gerhart, 2009).

Thus looking at our case, [Parks and Vu \(1994\)](#) argued that the Vietnamese culture is likely to be defined as highly collectivist as it holds characteristics similar to other very collectivistic societies. Specifically, Asian cultures generally score highest on collectivism scales ([Triandis, 1989](#)). In addition, an underdeveloped rural nation, such as Vietnam, depicts a close-knit social context that might arouse employees' cooperative orientation where the focus is on the greater good of the team ([Kagitcibasi and Berry, 1989](#)). On the other hand, Dutch culture has been found to be rather individualistic ([Eugène et al., 2017](#)). Therefore, participants in this study, because of their culture, might perceive relational climates differently and be influenced by them in a divergent way [[Ferraris et al. \(2019\)](#) found different moderating effects for individualistic (Italian) vs collectivist (Brazilian) cultures in the area of marketing].

The philosophy of a market pricing climate, which indicates the equivalent reciprocation of physical and non-physical rewards ([Fiske, 1992](#)), contradicts with the values of collectivism that prioritizes the group's needs over the individuals. However, it seems that under low openness to experience, people are more sensitive to the influence of context. The feature of proportionality in the social relations under this climate ([Fiske, 1992](#)) could activate the "intellect" and quick adaptation side ([Goldberg, 1990](#)) in people high on openness, which makes them take into account the cost-benefit ratio before deciding to share or conceal the knowledge they possess. In addition, the principles that are represented in a communal sharing climate, such as altruism and community interest ([Fiske, 1992](#)), are opposed to the values of individualism, where the priority of employees is their own interest and not the group. Hence, the findings that in an individualistic culture (such as The Netherlands) employees with low openness to experience hide more knowledge under high communal sharing climate are in alignment with the above line of reasoning, as knowledge hiding might be perceived as a means for personal success or keeping resources ([Černe et al., 2014](#)).

On top of national culture, a different factor that might explain why some hypotheses were not supported in both samples may be the measurement scale used for knowledge hiding. While this instrument represents a cumulative measure, knowledge hiding is composed of three dimensions – playing dumb, evasive hiding and rationalized hiding ([Fong et al., 2018](#)). More specifically, hiding knowledge can be associated with pretending to be ignorant (playing dumb), wanting to postpone the answer for tactical reasons (evasive hiding) and/or a desire to maintain confidentiality (rationalized hiding) ([Webster et al., 2008](#)). Although such behaviors may be viewed as mostly negative, the intention (e.g. confidentiality) may not necessarily be to harm a colleague, it may even be the opposite ([Connelly and Zweig, 2015](#)). Perhaps highly open people would be more inclined to engage in evasive hiding than in playing dumb or rationalized hiding. Moreover, it could be the case that in a communal sharing climate, people would play dumb (to save face) more often than show evasive or rationalized knowledge hiding, compared to people in a market pricing climate. Investigating such potential interactions of the three dimensions underlying our measure with the personal and situational variables in the present study would, however, require more sophisticated analyses than our sample sizes would warrant.

Overall, our results indicate that knowledge hiding is indeed the result of an intricate combination of individual characteristics (e.g. openness to experience) and contextual factors (e.g. relational climate). The main message here is that we will need to deploy a person-by-situation approach to get the best possible picture of how knowledge hiding works in practice. We believe that this is an important message for knowledge management literature as it adds a further layer of complexity in understanding how organizations can best manage and exploit knowledge management processes in culturally diverse contexts ([Del Giudice et al., 2012](#); [Ferraris et al., 2017](#)).



## Practical implications

In today's fast-changing workplace, intentionally concealing knowledge from others might threaten the organization's competitive advantage. Our results emphasize the significant role of climate and personality in predicting knowledge hiding; however, there is no universal recommendation that would work in every context. Organizations need to carefully assess the interaction between openness to experience and relational climates in a case-by-case scenario. These suggestions are highly relevant especially to multinational organizations, where business units situated in different countries might need to take into consideration different context-specific situations.

In the case of Vietnam, organizations need to realize that the context (relational climates) seems to dominate over individual characteristics (Cable and Edwards, 2004). Accordingly, practical strategies should aim to decrease the market pricing climate irrespective of people's level of openness to experience, as people under low market pricing score consistently lower on knowledge hiding. For some sectors or professions with highly open people (such as education or services), the practical implications from the present study become even more salient and extreme. Research by Tsay *et al.* (2014) found that knowledge withholding is related to normative conformity, thus our results expand this notion and suggest that a climate related to cost-benefit exchanges, such as market pricing, might lead to higher knowledge hiding. To prevent this, organizations should aim to implement HR practices aimed at reducing such a cost-benefit oriented social-exchange environment (Mossholder *et al.*, 2011). For example, downplaying the importance of various forms of rewards (both physical in terms of bonus, incentives and salary increase, and non-physical in terms of performance ratings or promotion criteria) might contribute to a weaker market pricing climate leading to lower knowledge hiding (Tett and Burnett, 2003).

In The Netherlands, the combination of relational climates and openness to experience is not so straightforward. As openness to experience is a stable characteristic, organizations might primarily want to change the context in place. Our results suggest that building a strong communal sharing climate might reduce knowledge hiding. The HR system is a crucial means by which managers can influence the relational climate (Mossholder *et al.*, 2011). Furthermore, commitment HR practices can be linked to trust and cooperation (Collins and Smith, 2006). Mossholder *et al.* (2011) proposed that helping behaviors, as one of the key components of the communal sharing climate, will be less task focused, more person focused and occurring more frequently under commitment HR systems. Moreover, findings from the Dutch sample also revealed that people with low levels of openness to experience hide more knowledge under a high communal sharing climate (compared to when the communal sharing climate is low). Therefore, the optimal approach for organizations in The Netherlands might be to not only increase the level of communal sharing climate but also activate people's sense of openness to experience. Our results highlight an important notion that enhancing the communal sharing climate might provide unique opportunities for personality trait expression. People prefer to work in cultures and climates similar to their personality (Tett and Burnett, 2003). Thus providing HR practices aimed at enhancing communal sharing climate might also cascade in enhancing individual openness to experience. Open individuals are more sensitive to rewards, returns and value they receive in exchange for the decision to hide or share knowledge (McCrae and Sutin, 2009; Wang *et al.*, 2014).

## Limitations and future research suggestions

As with all research, this study is not without limitations. First, we had a relatively small sample size of 20 and 32 teams for multilevel research (Maas and Hox, 2005) in Vietnam and The Netherlands. Therefore, we might not have enough statistical power in multilevel modeling to obtain accurate estimations for the hypothesized effects (Scherbaum and Ferreter, 2009). For

example, [Kreft \(1996\)](#) suggested a minimum sample size of 30 groups for multi-level analysis. Yet, small sample sizes might be deemed appropriate for exploratory research ([Wang et al., 2015](#)), as we also see our study. Moreover, with medium effect sizes, we still achieved a statistical power of 0.70 ([Scherbaum and Ferreter, 2009](#)). The power issues need to be kept in mind, however, when interpreting and generalizing our findings. In this vein, our study also did not follow suggested statistical cut-off points for item deletion. We believe, similarly to many authors ([Kopalle and Lehmann, 1997](#)), that such an approach is tricky and can jeopardize scale integrity and comparisons with other studies using the same scale; moreover, item deletion requires extensive re-validation and re-reliability checks. We reported all scale issues in the sections above, so the reader can decide himself/herself about the potential implications of such problems.

Second, our study adopted the survey method using self-reports, with cross-sectional data. Knowledge hiding is assumed to be a negative behavior ([Connelly et al., 2012](#)); consequently, people tend to underreport the true level of this undesirable behavior. Meta-analytical evidence suggests, however, that other-reported assessments of negative work behaviors might not capture unique and valid incremental variance beyond the self-reported variance ([Berry et al., 2012](#)). Nevertheless, we believe that complementing or expanding self-report measures with others might further enrich our understanding of this phenomenon. For example, a match or mismatch in perceptions of knowledge hiding between individuals and line managers might provide interesting insights into what organizations could do to lower knowledge hiding. As our study was cross-sectional, the causality inferred should be taken with caution. Further research is suggested to implement an experimental method or longitudinal data collection, which strengthens causal inferences and better captures participants' responses related to knowledge hiding and climate perceptions ([Bogilović et al., 2017](#); [Černe et al., 2014](#)). Additionally, one could argue that the measure of knowledge hiding cannot capture the frequency of phenomena; however, previously published research ([Babič et al., 2019](#); [Burmeister et al., 2019](#); [Černe et al., 2014](#); [Wang et al., 2019](#)) has successfully used it to measure the extent to which individuals hide knowledge. Furthermore, context theory researchers ([Johns, 2017](#)) have called to explore discrete events, which can be seen as occurrences that vary in strength. Thus, exploring knowledge hiding incidents can help us further understand how the context in place can relate to various organizational processes.

Third, while the present study considers relational climate, other organizational, workplace and individual characteristics also could explain why and when individuals deliberately conceal knowledge from their colleagues. For example, leadership style (transformational vs transactional) or middle management approach can influence employee behaviors in terms of organizational commitment, job satisfaction and job involvement ([Mester et al., 2003](#)), which in turn might be related to knowledge hiding. In addition to antecedents, better examining the consequences of knowledge hiding would add value to this topic and knowledge management practices in general. Besides existing studies focusing on individual and team creativity ([Bogilović et al., 2017](#); [Černe et al., 2014](#)) as well as voluntary turnover intentions ([Serenko and Bontis, 2016](#)) and sales performance ([Wang et al., 2019](#)), much more research is needed to explore the consequences of knowledge hiding. For example, to what extent does knowledge hiding influence individual and team performance? In terms of context, one might also consider the extent to which workers are afforded agency in their work and the extent to which workload pressures might disallow time for discretionary knowledge sharing, that is, might create a context in which knowledge hiding is somewhat inevitable. Another relevant avenue for further research in this area would be to add the organizational level to the individual and team levels that interplay to impact upon employees' knowledge hiding behavior.

Our final recommendation is to look at various facets of knowledge hiding. Our study mainly focused on general knowledge hiding and did not aim to distinguish its various dimensions. It cannot be assumed *per se* that failing to meet a request for knowledge is necessarily antisocial, dysfunctional or indeed knowledge hiding at all. Employees in practice typically have to prioritize how they spend their working time and it may be a pro-functional decision to choose to discourage colleagues from asking for knowledge to be shared with them or indeed to not share knowledge, which might then be interpreted by management as knowledge hiding. As outlined above, however, knowledge hiding is composed of three dimensions – playing dumb, evasive hiding and rationalized hiding. It may be that these three dimensions have different consequences and underlying mechanisms (Fong *et al.*, 2018). For example, rationalized hiding may be more strongly related to positive intentions than the other two dimensions. Innovative knowledge management strategies focusing on identifying knowledge hiding behavior, especially its more positive dimensions, might lead to better organizational results than those based on yet another plea for more and better knowledge sharing initiatives. Further research should therefore help organizations make better sense of the full range of ways to apply knowledge management approaches with a view to achieving desired organizational outcomes.

## Conclusion

In this study, we explored to what extent team-level communal sharing and market pricing relational climates moderate the relationship between individual-level openness to experience and knowledge hiding. We found the direct relationship between openness to experience and knowledge hiding neither in Vietnam nor in The Netherlands. In the Vietnamese sample, only the market pricing climate acted as a moderator, with higher levels of openness to experience and higher levels of market pricing climate being related to higher knowledge hiding. In contrast, in the Dutch sample, the interaction between higher levels of communal sharing climate and lower levels of openness to experience was related to higher knowledge hiding. While our paper cannot offer conclusive evidence, clearly the moderating role of relational climate in explaining the effect of personality traits, such as openness to experience, on knowledge hiding deserves further investigation. It may be even more worthwhile to conduct such studies in the wider context of different national cultures, as comparing just two countries (Vietnam and The Netherlands) in the current study already yielded markedly different outcomes. We call upon our international colleagues to share their, and further our, collective knowledge.

## Notes

1. We also conducted the regions of significance computation. The slopes' significance regions went from 0.56 for the lower region to 1.27 for the upper region. Simple slopes are significant outside this region.
2. We also conducted the regions of significance computation. The slopes' significance regions went from –0.22 for the lower region to 0.56 for the upper region. Simple slopes are significant inside this region.
3. We also conducted the regions of significance computation. The slopes' significance regions went from –17.38 for the lower region to 0.27 for the upper region. Simple slopes are significant inside this region.
4. We also conducted the regions of significance computation. The slopes' significance regions went from –2.15 for the lower region to 0.24 for the upper region. Simple slopes are significant outside this region.
5. We also conducted the regions of significance computation. The slopes' significance regions went from –2.96 for the lower region to 0.24 for the upper region. Simple slopes are significant outside this region.

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## Appendix. Knowledge hiding scale

Please think of a recent episode in which a specific co-worker requested knowledge from you and you declined to share your knowledge or expertise with him/her or did not give all of the information needed.

In this instance, I:

- Agreed to help him/her but never really intended to.
- Agreed to help him/her but instead gave him/her information different from what she/he wanted.
- Told him/her that I would help him/her out later but stalled as much as possible.
- Offered him/her some other information instead of what he/she really wanted.
- Pretended that I did not know the information.
- Said that I did not know, even though I did.
- Pretended I did not know what she/he was talking about.
- Said that I was not knowledgeable about the topic.
- Explained that I would like to tell him/her, but was not supposed to.
- Explained that the information is confidential and only available to people on particular project.
- Told him/her that my boss would not let anyone share this knowledge.
- Said that I would not answer his/her questions.

Source: [Connelly et al. \(2012\)](#)

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